

REMARKS

The following is responsive to the Patent Office Action mailed December 6, 2004. In response to the Restriction Requirement, claims 8 to 11 have been cancelled and thus, the Applicant affirms the provisional election of claims 1, 3 to 6 and 14 to 21.

Claim 1 has been amended to include the claimed subject matter of claim 4, claim 14 has been amended to include the claimed subject matter of claim 16 and new claim 22 claims the subject matter of claim 14 and new claim 22 includes the subject matter of claim 14 plus the subject matter of claim 17. Thus, based upon the indication of the allowability of claims 14, 16 and 17, the Applicant respectfully submits that claims 1 and 14, as amended, and new claim 22 are in condition for allowance.

New claims 23 to 25 are also added by this Amendment and the Applicant respectfully submits that new claims 23 to 25 also patentably define over the prior art for the reasons set forth below. Claims 2, 4, 7 to 13, 16, 20 and 21 are cancelled.

The Coating Device of this Invention

As set forth in the specification (p. 1, 2nd para.), the air flowing through the turbine of a rotary atomizer is initially at ambient temperature; however, the air is cooled due to the pressure drop in the turbine to temperatures that depend on the turbine output, resulting in a temperature drop of about -20°C. This temperature drop may be greater than -40°C if the output of the turbine is further increased. Thus, "Even for turbines of relatively low output, problems can arise because of the formation of condensation water due to cooling, when the water content (pressure dew point) of the compressed air feed to the turbine does not correspond to the value set for the coating system." (p. 1, 3rd para.). Further, "Because the exhaust gas of the turbine could disturb the coating process, if it were to be discharged directly onto the atomizer in the cabin, the exhaust gas is typically deflected by the arm of the coating machine, such as a painting robot, carrying the atomizer, so that, e.g., also the surfaces of the flange connection

between the atomizer and the hand joint of the machine and the adjacent areas of the machine are cooled with the result of the formation of condensation water. The resulting water drops can cause painting errors.” (p. 1, 3rd para.).

Thus, heating of the drive gas of the turbine is advantageous, but “if only the supply air is heated, a portion of the heating energy is lost through heat condensation to the supply side of the atomizer, which is less affected by the formation of condensation water, and/or the consequence of undesired heating of components of the atomizer located at this position. In general, the possibility of heating is limited by the permissible maximum temperatures of the effective components or line hoses, etc., sometimes made of plastic.” (p. 2, 2nd para.). A further advantage is provided by “heating of the bearing air” because the bearing air “flows through a large part of the turbine and therefore the turbine can be heated more uniformly.” (p. 3, 1st para.). Further, “heating of the exhaust gas of the turbine can be especially advantageous by means of a heat exchanger, which carries on one side an air flow from the exhaust air and on the other side an air flow from the supply of the turbine” and “supply side air channels.” Thus, the apparatus of this invention not only prevents condensation from occurring within the rotary atomizer, but also other components and the shaping air which is directed toward or against the rotating bell-shaped plate.

The apparatus disclosed in Figure 1, includes two fluid or air streams which are directed through the rotary atomizer 1 from the attachment flange 2 to the steering air nozzles 8 and 9. The first airstream is received through flange opening 10, through passage 14, then 12 into air space 16 and finally through the holes 17 in the steering air ring 6 to the outer steering air nozzle 8 and directed toward or against the rearward side of the rotating bell-shaped plate 4 to shape the coating received through the bell-shaped plate 4. The heated fluid under pressure is received over the bearing unit 19 and contacts the interior of the housing 7. The second passage 11 also through the attachment flange 2 is directed through the turbine 5, through air space 20 and

through the inner air nozzle 9 again against or toward the back of the rotating bell-shaped plate 4. As set forth above, the fluid passing through these passages results in a significant temperature drop because the air is cooled due to the pressure drop in the turbine that depend upon the turbine output which ranges from -20°C to -40°C. This temperature drop results in condensation or water droplets in the rotary atomizer which may be entrained in the steering air and condensation on the housing, both of which may adversely affect the coating applied by the rotary atomizer.

Finally, as disclosed in Figure 2, the drive air A is preferably lead through a heat exchanger 116 after heating by the heating device 115. The path 113 of the exhaust gas also leads through the heat exchanger so that the exhaust gas is also heated by the supply air. The drive air A is controlled by a temperature regulator 118, which compares the actual value t_i coming from at least one temperature sensor located in the atomizer with a desired value t_s and controls the heating device 115 depending on the result.

The Applicant respectfully submits that *none of the prior art references* taken alone or in combination teach this invention as now discussed.

The Takeuchi, et al. Reference

U.S. Patent No. 4,700,896 of *Takeuchi, et al.* discloses a rotary type electrostatic spray painting device which has as its object “to provide a rotary type electrostatic spray painting device capable of improving the productivity by shortening the cleaning time thereof.” (Col. 1, line 67 to col. 2, line 2). This is accomplished by injecting pressurized air in a direction which causes the braking turbine wheel 32 to act as a brake on the shaft 4. This direction is opposite to the direction of rotation of the shaft 4, which rotation is caused by pressurized air injected from the air injection nozzle 46 toward the turbine blades 47 of the drive turbine wheel 30, reducing the rotational speed of the turbine during the cleaning cycle. As illustrated in Figure 1, a main air supply conduit 60 connected to the air feed pump 71 is divided into three air supply conduits

57, 58 and 59, wherein the first air supply conduit 57 is connected to the air inlet 38 of the thrust air bearing and the inlets 24, 25 of the radial bearings 18 and 19. The second air supply conduit 58 is connected to the air inlet 45 of the turbine nozzle holder 42. The third air supply 59 is connected to the air inlet of the turbine nozzle 43. (Col. 4, lines 20 to 30 and 40 to 48).

The *Takeuchi, et al.* reference does teach heating of the air supply to the rotary atomizer, but the purpose is not the same as this invention. As stated in the specification of the *Takeuchi, et al.* reference (col. 4, lines 48 to 57):

An air heating device 69 *for vaporizing water droplets contained in the pressurized air* is arranged in the main air supply conduit 60, and a regulator 68 for maintaining the pressurized air at a predetermined pressure is also arranged in the main air supply conduit 60. In addition, a stop valve is arranged in the main air supply conduit 60 upstream of the air heating device, and another stop valve 67 is arranged in the main air supply conduit 60 downstream of the regulator 68. (emphasis added).

Thus, the purpose of the heating device 69 shown in Figure 1 is “for vaporizing water droplets *contained in the pressurized air.*” Thus, the Applicant respectfully submits that the *Takeuchi, et al.* reference does not address the problem addressed by the rotary atomizer of this invention.

The Govindan Reference

U.S. Patent No. 3,979,535 of *Govindan* discloses a process for spray application of aqueous paints by controlling the temperature of the air in the paint spray zone and does not heat the air in a rotary atomizer. That is, as shown in Figure 1, the temperature and the relative humidity directed *to the spray booth* is controlled and thus “increases the rate of drying of the paint during application thereby eliminating sagging and running of the paint.” (Col. 3, lines 27 to 33). This is made clear in the specification of the *Govindan* reference where it states “The air is then passed onto the portion of the spray booth (sic) over a second set of temperature and humidity indicators electrically coupled to the computer controller. The computer controller receives the signals from the temperature and humidity indicators and utilizes the data to control

the heater and the humidifier.” (Col. 4, lines 29 to 35). Thus, the purpose of controlling the temperature and humidity of the air *in the paint booth* adjacent the paint applicators is to increase the rate of drying to eliminate sagging and running of the paint.

The Applicant respectfully submits that it would not be obvious to combine the disclosure of the *Govindan* patent with the disclosure of the *Takeuchi, et al.* patent because the *Govindan* patent is directed to solving an entirely different problem. However, if combined, the combination would include controlling the temperature in humidity *in the paint spray booth* where the electrostatic painting device of *Takeuchi, et al.* is located.

The Tomita, et al. Patent

The Examiner rejected claim 21 as unpatentable over U.S. Patent No. 5,788,164 of *Tomita, et al.* in view of the teaching of the *Takeuchi, et al.* patent and U.S. Patent No. 5,863,613 of *Emch* (discussed below). The *Tomita, et al.* patent discloses a rotary atomizing electrostatic coating apparatus generally as described in paragraph 11 of the Office Action. However, it should be noted that the shaping air received through passage 25 is not directed toward or against the bell cup 12 and the second passage 22 directed to the bearing prevents reverse flow and is not shaping air. More importantly, as noted by the Examiner, “Tomita et al. lacks teaching a heater for heating at least one of the fluid flow stream, the second fluid stream and the bearing.” Thus, the rotary atomizer is not as disclosed in this application and the *Tomita, et al.* patent does not even address the problem solved by this invention much less suggest a solution. Further, as set forth above, the *Takeuchi, et al.* patent also does not address the same problem.

The Emch Patent

U.S. Patent No. 5,863,613 of *Emch* discloses an apparatus and method for spray painting which, as shown in Figure 1, includes heat exchangers 12 *which heat the paint* “to prevent possible damage to the paint composition and/or to the extended presence of a heated paint composition in the spray apparatus.” (Col. 2, lines 45 to 50). The “heat exchange unit 12 is located closely adjacent to each paint spray device 8” and the preferred heat transfer fluid is a high dielectric oil. (Col. 4, lines 58 to 67). It is not understood how the Examiner would propose to combine the *Emch* patent with either the *Tomita, et al.* patent or the *Takeuchi, et al.* patent. Obviously, the heat exchangers disclosed in the *Emch* patent are for an entirely different purpose and address an entirely different problem. The Applicant therefore respectfully submits that it is improper to combine the teaching of the *Emch* patent with the other references. However, if the teaching of the *Emch* patent were combined with the teaching of the *Tomita, et al.* patent or the *Takeuchi, et al.* patent, the combination would result in *heating the paint* with a heat exchanger.

The Claims Remaining in this Application

As set forth above, claims 1 and 14 as amended and new claim 22 are in condition for allowance based upon the Examiner’s finding that claims 4, 16 and 17 would be allowable if rewritten in independent form. Thus, this discussion will be limited to new claims 23 to 25.

New claim 23 claims a rotary atomizer for applying a coating which includes a turbine motor, a shaft driven by the turbine motor supported by a bearing unit, a rotating bell-shaped plate supported on the shaft receiving coating from the rotary atomizer, a fluid passage extending through the rotary atomizer driven by fluid received under pressure through the fluid passage and wherein the fluid passage has an outlet directing fluid against the rotary bell-shaped plate and “a heater heating fluid received through said fluid passage, thereby heating fluid driving said turbine motor and fluid directed toward said rotating bell-

shaped plate” thereby reducing water condensation of the fluid received through the fluid passage. The Applicant respectfully submits that the rotary atomizer of new claim 23 is not disclosed or suggested in the prior art cited by the Examiner and is therefore in condition for allowance.

New claim 24 recites that the fluid passage extends through the rotary atomizer and around the bearing unit having an outlet directing fluid toward the rotating bell-shaped plate, thereby heating the fluid directed around the bearing unit and through the outlet toward the rotating bell-shaped plate. Again, the Applicant respectfully submits that the prior art references cited by the Examiner do not disclose or suggest this combination.

Finally, claim 25 also claims a rotary atomizer which includes a turbine motor supported by a bearing unit driven by a fluid stream, a shaft of the rotary atomizer driven by the turbine motor, an inlet path through which the fluid stream is supplied under pressure to a turbine wheel of the turbine motor, an outlet path through which the fluid stream evacuates the bearing unit at a lower pressure “and a heating device for heating said fluid stream flowing through said turbine wheel and said inlet path and said outlet path,” including “a temperature sensor connected to a temperature regulator regulating said heating device to maintain a temperature of one of said fluid stream, inlet path and outlet path.” As set forth above, it would not be obvious to combine the teaching of the *Govindan* patent with the disclosure of the *Takeuchi, et al.* patent for several reasons. First, as the Examiner is aware, there must be some teaching or motivation *in the references* for combining references in a rejection under 35 U.S.C. § 103. The Applicant respectfully submits that there is no teaching or suggestion for combining these references in the references themselves. First, the heating device 69 disclosed in the *Takeuchi, et al.* reference is for a different purpose, i.e., “for vaporizing water droplets contained in the pressurized air.” Thus, the heater of the *Takeuchi, et al.* patent is intended to vaporize water droplets “contained in the pressurized

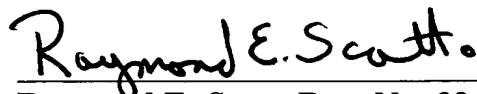
air.” All that would be required is to heat the temperature of the incoming air to a temperature greater than the boiling temperature of water. There is no reason or need to control this temperature to achieve this purpose. Further, the *Govindan* patent discloses controlling the temperature and humidity of the air *entering the spray booth*. Thus, although the Applicant respectfully submits that it would not be obvious to combine the teaching of these two references, the result would be controlling the temperature and humidity of the paint spray booth containing the rotary atomizer disclosed in the *Takeuchi, et al.* patent based upon the teaching of the *Govindan* patent.

The Applicant therefore respectfully submits that the claims remaining in this application patentably distinguish over the prior art taken alone or taken in combination, and the Applicant respectfully requests allowance of the claims remaining in this application.

Enclosed is our check in the amount of \$400.00 as required for the filing of this Amendment. If there are any additional fees due, the Commissioner is authorized to charge our Deposit Account for those additional fees or credit the account for any overpayments regarding this Amendment.

Respectfully submitted,

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I hereby certify that the enclosed **Amendment** is being deposited with the United States Postal Service as Express Mail, postage prepaid, in an envelope as "Express Mail Post Office to Addressee," Mailing Label No. **EV612879282US** and addressed to **Mail Stop Non-Fee Amendment**, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on **March 7, 2005**.

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